

# Effort-reward imbalance, emotional exhaustion and depersonalisation among public primary health care physicians: a cross-sectional study in Indonesia

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**Summary Background.** Primary health care physicians are at high risk of burnout. In addition, with the current conditions, they can have an effort-reward imbalance. However, studies on this topic concerning public primary health care (Puskesmas) physicians in Indonesia are still limited.

**Objectives.** To assess whether the effort-reward imbalance among Puskesmas physicians is associated with two main burnout dimensions: emotional exhaustion and depersonalisation.

**Material and methods.** This cross-sectional study surveyed physicians working in Puskesmas in Indonesia using the short version of the Effort-Reward Imbalance Questionnaire and Maslach Burnout Inventory-Human Services Survey questionnaires.

**Results.** Of 226 physicians, 45.6% perceived high effort and low reward. A perceived effort-reward imbalance was higher among those working more than 40 hours weekly in work shifts and in urban areas. Significant predictors of emotional exhaustion included effort-reward ratio ( $\beta = 0.426$ ;  $p < 0.001$ ), overcommitment ( $\beta = 0.393$ ;  $p < 0.001$ ) and working period at Puskesmas ( $\beta = -0.122$ ;  $p = 0.038$ ). Predictors of depersonalisation include effort-reward ratio ( $\beta = 0.257$ ;  $p = 0.001$ ), overcommitment ( $\beta = 0.170$ ;  $p = 0.024$ ), and night shift ( $\beta = 0.134$ ;  $p = 0.042$ ).

**Conclusions.** The effort-reward imbalance is significantly associated with emotional exhaustion and depersonalization. Therefore, it is important to set up the maximum working hours, balanced shift work arrangements, and standardized rewards for Puskesmas physicians.

**Key words:** burnout, psychological; occupational stress; primary health care; physicians.

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## Background

Burnout is a multidimensional psychological syndrome as a long-term response to the failure to manage exposure to chronic stress in the work environment [1–4]. There are three dimensions of burnout based on the Maslach and Jackson [5] concept: emotional exhaustion, depersonalisation and low personal accomplishment. Of these three dimensions, emotional exhaustion and depersonalisation are the main dimensions of burnout [6–8]. Emotional exhaustion indicates a drain on workers' energy triggered by work stressors, while depersonalisation (cynicism) shows indifference to work, manifested in a cynical attitude towards clients or patients [1, 3, 4].

Today, burnout has become one of the important health problems related to job stress that has received widespread attention [9] and is considered a serious burden to society [10]. WHO [2] has also defined burnout on the ICD-11 as a health problem related to work factors. In addition, several European countries have recognised burnout as an occupational disease and have established compensation policies [11].

The results of studies show that physicians are prone to psychological disorders such as anxiety, depression [12, 13], stress and burnout [13]. Physicians are at high risk for burnout due to intensive interaction with their patients in order to deal with the health problems of their patients, making them more susceptible to exposure to chronic stressors [5, 14]. Physicians who work in primary health care are more at risk of burnout due to the high demand for service quality, the large and diverse number of patients, as well as the comprehensive, integrated and sustainable community-based service system [15–18]. Burnout in physicians can be a serious threat to a physician's health [19] and may also have an impact on the health care system [18–20]. As such, it needs serious attention from various relevant stakeholders.

However, burnout is different from other psychological disorders, such as depression, where complete management is widely available [21]. The management of burnout is still facing issues including an absence of consensus regarding clinical diagnosis [22]. In addition, knowledge of the factors that contribute to burnout in different work environments and socio-demographic conditions is also inconsistent and limited, so further studies on burnout are still needed [19].



Burnout is one of the three main health disorders – besides depression and psychosomatic disorders – in health workers that stems from job stressors [23]. Studies report burnout among physicians in different countries with varying prevalence [13, 24–27]. For example, a study in India reported that 45.02% of physicians scored highly on the emotional exhaustion dimension, and 65.98% on depersonalisation [25]. Meanwhile, in Saudi Arabia, moderate to severe emotional exhaustion scores for physicians in primary health care reached 69.5% [26].

In Indonesia, public primary health care facilities are referred to as “Puskesmas”. The Puskesmas serve the population in specific coverage and are responsible for public health measures, including health promotion and disease prevention. Due to these responsibilities, physicians in Puskesmas should provide both individual health services and community-based health services and management [28, 29]. In addition to running various health programmes and policies, Puskesmas also empower the community and build networks with private health service facilities in their working areas [28–30].

Indonesia has been implementing National Health Insurance (Jaminan Kesehatan Nasional, JKN) since 2014, which is managed by the Health Social Security Administering Agency (BPJS Kesehatan), a public legal entity [31]. This programme has increased the population coverage and improved Indonesians’ access to basic health services through a single-payer insurance system. Of the several types of primary health care facilities that become BPJS Kesehatan providers, the largest proportion (43.96%) is Puskesmas [32].

Of 156,616 registered general physicians in Indonesia [33], 24,745 (15.8%) work in Puskesmas [34]. In this JKN era, Puskesmas physicians are expected to prevent secondary health care facilities from being overloaded by providing comprehensive health services at the primary level in the community [35]. However, there is still an imbalance in the distribution and ratio of Puskesmas physicians in Indonesia, as well as the number of other health professionals who are also still lack [36]. This can have an impact on increasing the burden of Puskesmas physicians, because the workload that should be carried out by other health workers is also borne by the physicians [36, 37]. Puskesmas physicians also have to put forth more effort to provide health care to a larger population. In line with the increasing coverage of JKN participation from 171,939,254 people in 2016 to 222,461,906 people in 2020, the number of patient visits in primary care also continues to increase, from 120.9 million visits in 2016 to 146.1 million visits in 2020 [32].

In addition, there are several aspects of the implementation of JKN that still cause dissatisfaction among many primary care physicians [38]. The administration of JKN is considered to be complex and burdensome in practice, in conditions of limited clinical resources, powerlessness and lack of support for physicians [39]. The rewards, on the other hand, have not significantly improved. In addition, the gap in incentives received by Puskesmas physicians between provinces is still high. As an illustration, the highest average income incentive for physicians at Puskesmas was IDR 11,203,819.60, while the lowest average incentive for physicians was IDR 1,299,212.72 [36].

Thus, under these conditions, Puskesmas physicians in Indonesia may also perceive the imbalance between their efforts and received rewards, and the risk of burnout may increase due to this imbalance [27, 40, 41]. The theoretical basis of the Effort-Reward Imbalance Model (ERI model) [42–44] is that physicians put in efforts at work exceeding their received rewards, including salary, work recognition and promotion. In addition to efforts and reward, the ERI model includes ‘overcommitment’. This is mainly indicated by an excessively motivated work drive that can amplify the adverse effects of ERI. The perceived ERI, therefore, becomes one of the work-related stressors that can negatively affect the psychobiological condition of primary health care physicians [42–44].

Although the relationship between the effort-reward imbalance and burnout in physicians has also been studied [27, 40, 41], so far there has been no study on these Indonesian Puskesmas physicians. This study, therefore, aimed to assess the effort-reward imbalance among Indonesian Puskesmas physicians and its associations with two dimensions of burnout: emotional exhaustion and depersonalisation.

## Material and methods

This cross-sectional study surveyed physicians who have worked at Puskesmas in Indonesia for at least six consecutive months. The survey was conducted from March to April 2021. We distributed an online self-administered questionnaire developed using the LimeSurvey (survey.ui.ac.id) platform through social media networks of doctors in Indonesia with the snowball sampling technique. This method is relatively safe and efficient to implement during the COVID-19 pandemic, as has been used by previous researchers [45]. The survey was closed after the number of respondents exceeded the minimum sample size. We calculated the minimum sample size estimation based on the rule of the thumb for the multivariate test: 10 respondents per independent variable. We also made corrections to the sample size using the formula  $n' = n/(1 - f)$  [46]. In this study, the assumption of a maximum of 15 independent variables could be included in the multivariate test. With  $n$  being the sample size before correction, which is 150, while  $f$  is the correction factor that we set at 10%, thus the minimum sample size is 167 respondents.

We analysed the socio-demographic and job characteristics variables, respectively, as binary categorical data. These included age, gender, marital status, income, the average number of hours worked per week at the Puskesmas, night shift duty, working period at Puskesmas, managerial duties, Puskesmas category (based on the type of service and characteristics of the working area) [28], employment status, geographic location of the Puskesmas and the average number of patients treated per day.

### Effort-reward imbalance

The shortened version of the Effort-Reward Imbalance Questionnaire (ERI Questionnaire) was used to measure the effort-reward imbalance variables [47]. This study uses the short version of the ERI questionnaire, which has been adapted into Indonesian and which has been published and can be downloaded for free [48] and has been used in studies on local populations [49]. This short version of the ERI questionnaire consists of 16 items: 3 items for effort, 7 items for reward and 6 statement items for overcommitment. Each item is answered on a 4-point Likert scale, from “strongly disagree” to “strongly agree”. We measured the balance of efforts and rewards by calculating the ratio of effort to rewards (Effort-Reward ratio, ER ratio). The higher the score of this ratio, the greater the imbalance. Scores higher than 1.0 indicate an imbalance – the efforts exceed the received rewards. The effort-reward ratio is calculated based on the formula:  $ER\ ratio = k (effort\ score)/(reward\ score)$ , with a “ $k$ ” value in the short version of the ERI questionnaire of 2.33 [47].

### Burnout dimensions

We used Maslach Burnout Inventory-Human Services Survey (MBI-HSS) [4] to measure burnout dimensions after permission from its publisher. There are 3 dimensions of burnout as measured by the MBI-HSS: emotional exhaustion, depersonalisation and personal accomplishment [4]. As emotional exhaustion and depersonalisation are considered the main dimensions of burnout [6–8], and personal accomplishment is thought to be more strongly related to the availability of resources and social

support than to workload or work stressors [50], in this paper, we decided to focus on analysing and discussing emotional exhaustion and depersonalisation. A previous study [8] also focused more on analyzing the two core dimensions of burnout. A review article [22] also shows that many authors who based operational burnout solely on emotional exhaustion and/or depersonalisation do not include personal accomplishment [22].

The MBI-HSS questionnaire has also been adapted into Indonesian [51]. Emotional exhaustion was measured by 9 statement items, and 5 items were used to measure depersonalisation. All statements ranged from a score of “never” (0) to “every day” (6). The higher the score for emotional exhaustion and depersonalisation, the higher the degree of burnout [4].

## Statistical analysis

We analysed data using SPSS version 20 software. Socio-demographic and job characteristics were displayed in numbers (*n*) and percentages (%). Effort-reward imbalance and burnout dimension scores were displayed in mean, standard deviation, median, minimum and maximum values. We tested the normality of data distribution using the Kolmogorov-Smirnov/Shapiro-Wilk method before analysing the correlation between variables, displayed in *r* values, using the Pearson or Spearman Rho tests. In bivariate analyses, we assessed the relationship between socio-demographic and job characteristics with ER ratio and burnout dimension scores using Mann-Whitney tests [52]. To determine the strongest predictor of burnout dimensions, we conducted a multiple linear regression test. The condition for the independent variables included in the multiple linear regression test is that the *p*-value of the bivariate test is less than or equal to 0.25 [52]. The significance level was set at 0.05 [53].

## Ethical statement

This study received ethical approval from the Ethics Committee of the Faculty of Medicine, Universitas Indonesia-Cipto Mangunkusumo Hospital. We provided a written explanation of this study and the option to participate in this study or not on the home page of the online survey.

## Results

Of the 234 responses, 8 were excluded from analysis. 2 had an invalid IP address, and 6 did not fill in complete information regarding the name/location of the Puskesmas. We then entered 226 responses for analysis. The subjects were Puskesmas physicians in 23 provinces of Indonesia, mostly from East Java (19.91%), West Java (19.46%) and Jakarta (10.61%). Most of the subjects were female (69.9%), married (82.7%) and earning no more than 10 million IDR (86.7%). Subjects with an average number of working hours at the Puskesmas per week of more than 40 hours amounted to 43.8%. Most of the subjects admitted to having additional tasks in the management of the Puskesmas (78.3%). Subjects who reported treating an average number of patients of more than 25 people per day amounted to 68.6%. More complete information regarding the socio-demographic and job characteristics of the subjects is listed in Table 1.

Based on the results of the Kolmogorov-Smirnov/Shapiro-Wilk normality test, the score for burnout dimensions showed an abnormal distribution of data ( $p < 0.05$ ). The median score for emotional exhaustion was 12, with the lowest score being 0 and the highest being 51. The highest score for depersonalisation was 30, with a median of 2. The scores of the effort-reward imbalance variables, based on the Kolmogorov-Smirnov/Shapiro-Wilk normality test, also showed an abnormal distribution of the data ( $p < 0.005$ ). It can be seen that the median effort-reward ratio is 0.98; some participants received a score of 0.28, but there are also participants who reach a score of 3.00. Wide ranges were also seen in scores for work effort, employee benefits and overwork com-

mitment. The proportion of respondents with an effort-reward ratio of more than 1 amounted to 45.6% (Table 2).

**Table 1. Subjects and Puskesmas characteristics (*n* = 226)**

Variable	<i>n</i> (%)
<b>Socio-demographic characteristics</b>	
Age (years)	
< 35	112 (49.6%)
≥ 35	114 (50.4%)
Gender	
female	158 (69.9%)
male	68 (30.1%)
Marital status	
single/widower/widow	39 (17.3%)
married	187 (82.7%)
Income per month	
≤ IDR 10 million	196 (86.7%)
> IDR 10 million	30 (13.3%)
<b>Job characteristics</b>	
Working hours per week	
≤ 40 hours	127 (56.2%)
> 40 hours	99 (43.8%)
Night shift	
no	190 (84.1%)
yes	36 (15.9%)
Working period at Puskesmas	
6 months – 5 years	104 (46.0%)
> 5 years	122 (54.0%)
Managerial duties	
no	49 (21.7%)
yes	177 (78.3%)
Type of Puskesmas service	
outpatient	125 (55.3%)
inpatient	101 (44.7%)
Characteristics of Puskesmas working area	
urban	102 (45.1%)
rural/remote/very remote	124 (54.9%)
Employment status	
non-civil servant	73 (32.3%)
civil servant	153 (67.7%)
Geographical location of Puskesmas	
Java	141 (62.4%)
outside Java	85 (37.6%)
Average number of patients (per day)	
≤ 25 patients	71 (31.4%)
> 25 patients	155 (68.6%)

*n* – total, IDR – Indonesian Rupiah.

**Table 2. Burnout dimensions and effort-reward imbalance scores**

Variable	Median (min–max)	Mean ± SD
Burnout dimensions scores		
emotional exhaustion	12 (0–51)	16.39 ± 13.41
depersonalisation	2 (0–30)	3.79 ± 5.31
Effort-reward imbalance scores		
effort	8 (3–12)	7.89 ± 1.77
reward	18 (7–27)	17.97 ± 3.38
ER ratio	0.98 (0.28–3.00)	1.09 ± 0.42
≤ 1.00		<i>n</i> = 123 (54.4%)
> 1.00		<i>n</i> = 103 (45.6%)
overcommitment	15 (7–24)	15.47 ± 3.34

*n* – total, min – minimum, max – maximum, SD – standard deviation.

Variable	median (min–max)	mean ± SD	<i>p</i>
Age (years)			0.415
< 35	0.98 (0.42–2.85)	1.11 ± 0.41	
≥ 35	0.98 (0.28–3.00)	1.07 ± 0.44	
Gender			0.366
female	0.98 (0.28–2.33)	1.06 ± 0.37	
male	0.99 (0.30–3.00)	1.15 ± 0.52	
Marital status			0.065
single/widower/widow	1.10 (0.28–2.85)	1.23 ± 0.54	
married	0.98 (0.30–3.00)	1.06 ± 0.39	
Income per month			0.823
≤ IDR 10 million	0.98 (0.30–3.00)	1.09 ± 0.43	
> IDR 10 million	1.00 (0.28–2.00)	1.05 ± 0.39	
Number of hours worked per week			< 0.001
≤ 40 hours	0.93 (0.42–2.33)	0.99 ± 0.34	
> 40 hours	1.17 (0.28–3.00)	1.21 ± 0.48	
Night shift			0.026
no	0.97 (0.28–2.85)	1.06 ± 0.41	
yes	1.19 (0.42–3.00)	1.23 ± 0.48	
Working period at Puskesmas			0.324
6 months – 5 years	0.98 (0.42–2.85)	1.12 ± 0.42	
> 5 years	0.98 (0.28–3.00)	1.06 ± 0.43	
Managerial duties			0.067
no	0.89 (0.49–2.00)	1.02 ± 0.41	
yes	0.98 (0.28–3.00)	1.11 ± 0.43	
Type of Puskesmas service			0.056
outpatient	1.04 (0.52–2.85)	1.13 ± 0.42	
inpatient	0.93 (0.28–3.00)	1.04 ± 0.43	
Characteristics of Puskesmas working area			0.044
urban	1.05 (0.28–2.80)	1.13 ± 0.41	
rural/remote/very remote	0.95 (0.30–3.00)	1.05 ± 0.44	
Employment status			0.204
non-civil servant	0.98 (0.28–2.10)	1.11 ± 0.37	
civil servant	0.98 (0.30–3.00)	1.08 ± 0.45	
Geographical location of Puskesmas			0.734
Java	0.98 (0.28–3.00)	1.01 ± 0.44	
outside Java	0.98 (0.30–2.33)	1.07 ± 0.40	
Average number of patients (per day)			0.059
≤ 25 patients	0.91 (0.42–2.33)	1.02 ± 0.38	
> 25 patients	1.00 (0.28–3.00)	1.12 ± 0.44	

Min – minimum, max – maximum, SD – standard deviation, IDR – Indonesian Rupiah.

Variable	Emotional exhaustion score		Depersonalisation score	
	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>
Effort	0.642	< 0.001	0.411	< 0.001
Reward	-0.551	< 0.001	-0.341	< 0.001
ER ratio	0.688	< 0.001	0.419	< 0.001
Overcommitment	0.637	< 0.001	0.363	< 0.001

Spearman Rho correlation test results, *r* – correlation coefficient; *p* – level of significance.

Based on the results of the Mann-Whitney test, it is proven that statistically there is a significant difference in the effort-reward ratio between the group of Puskesmas physicians who work more than 40 hours per week compared to the group of physicians whose weekly working hours do not exceed 40 hours ( $p = 0.000$ ). In addition, it is also statistically proven that the effort-reward ratio of physicians on night duty is higher than those who are not ( $p = 0.000$ ). Puskesmas physicians who work in urban areas have a greater effort-reward ratio than their colleagues who work in rural/remote/very/remote areas ( $p = 0.044$ ) (Table 3).

Table 4 shows the results of the correlation test. It can be seen that effort, reward, ER ratio and overcommitment have been shown to have a significant positive correlation with emotional exhaustion (each with  $p < 0.001$ ). The correlation coefficient between reward and emotional exhaustion ( $r = -0.551$ ;  $p < 0.001$ ) appears to be negative, indicating an inverse relationship. There is also a significant correlation between effort, reward, effort-reward ratio, as well as overcommitment and depersonalisation (each with  $p < 0.001$ ). Reward, as with emotional exhaustion, also has a negative correlation coefficient with depersonalisation ( $r = -0.341$ ;  $p < 0.001$ ), indicating that

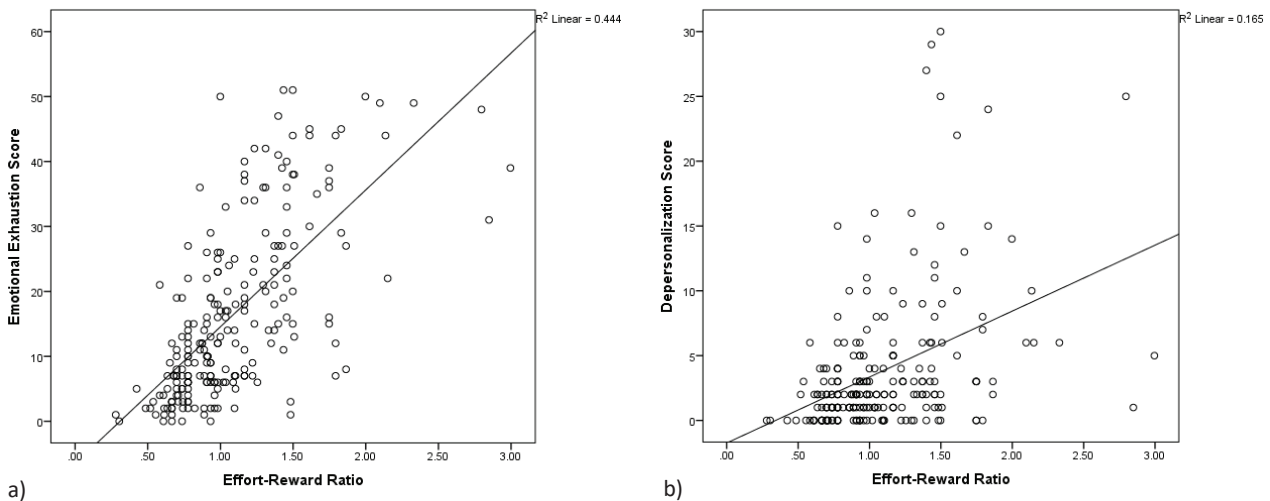


Figure 1. ER ratio correlation with two main burnout dimensions: a) ER ratio and emotional exhaustion, b) ER ratio and depersonalisation.

the higher the reward, the lower the depersonalisation score. The ER ratio appears to be more strongly correlated with emotional exhaustion ( $r = 0.688$ ) than depersonalisation ( $r = 0.419$ ). An overview of the association between ER ratio and burnout dimensions can also be seen in Figure 1.

Table 5 presents the results of the bivariate test between social-demographic variables and job characteristics with burnout dimensions. The number of working hours per week ( $p = 0.001$ ), night shift work ( $p = 0.044$ ), working period at the Puskesmas ( $p = 0.001$ ), type of Puskesmas service ( $p = 0.049$ ) and the characteristics of the Puskesmas working area ( $p = 0.034$ ) were statistically proven to be significantly associated with emotional exhaustion. Night work ( $p = 0.013$ ) and the characteristics of the Puskesmas working area ( $p = 0.007$ ) were shown to be significantly related to depersonalisation.

Effort and reward are not included in the multiple regression test as they are components of the ER ratio [47]. There are 10 variables that meet the requirements to be tested for multiple linear regression for emotional exhaustion scores, including ER ratio, overcommitment, age, marital status, working hours per week, night shift, working period at Puskesmas, type

of Puskesmas service, characteristic of Puskesmas working area and the geographical location of the Puskesmas. The 9 variables included in the multiple linear regression test for depersonalisation are ER ratio, overcommitment, marital status, income per month, working hours per week, night shift, type of Puskesmas service, characteristics of Puskesmas working area and geographical location of Puskesmas.

The results of the multiple linear regression test are shown in Table 6. The strongest predictors of emotional exhaustion scores, respectively, were ER ratio ( $\beta = 0.426$ ;  $p < 0.001$ ), overcommitment ( $\beta = 0.393$ ;  $p < 0.001$ ) and working period in Puskesmas ( $\beta = -0.122$ ;  $p = 0.038$ ). Compared to other variables, the ER ratio ( $\beta = 0.257$ ;  $p = 0.001$ ) was the strongest predictor of depersonalisation scores, followed by overcommitment ( $\beta = 0.170$ ;  $p = 0.024$ ) and night work assignments ( $\beta = 0.134$ ;  $p = 0.042$ ). Meanwhile, the type of Puskesmas service ( $\beta = 0.147$ ;  $p = 0.032$ ) was the only significant predictor of personal accomplishment score. The independent variables tested can predict an emotional exhaustion score of 57% and depersonalisation score of 19.7%.

Table 5. Association between socio-demographic and job characteristics with emotional exhaustion and depersonalisation

Variable	Emotional exhaustion score			Depersonalisation score		
	median (min–max)	mean ± SD	p	median (min–max)	mean ± SD	p
Age (years)			0.148			0.714
< 35	13.50 (0–51)	17.74 ± 13.84		2.00 (0–30)	4.11 ± 5.99	
≥ 35	12.00 (0–50)	15.07 ± 12.89		2.00 (0–25)	3.48 ± 4.56	
Gender			0.823			0.569
female	12.00 (0–51)	16.02 ± 12.86		2.00 (0–30)	3.51 ± 4.72	
male	12.50 (0–51)	17.26 ± 14.67		2.00 (0–29)	4.46 ± 6.47	
Marital status			0.162			0.084
single/widower/widow	14.00 (1–51)	20.28 ± 16.38		3.00 (0–30)	5.74 ± 7.23	
married	12.00 (0–50)	15.58 ± 12.60		2.00 (0–27)	3.39 ± 4.74	
Income per month			0.813			0.082
≤ IDR 10 million	12.00 (0–51)	16.42 ± 13.54		2.00 (0–30)	3.69 ± 5.32	
> IDR 10 million	14.50 (1–50)	16.20 ± 12.69		3.00 (0–27)	4.43 ± 5.34	
Working hours per week			<b>0.001</b>			0.058
≤ 40 hours	10.00 (0–49)	13.46 ± 11.17		2.00 (0–16)	2.87 ± 3.46	
> 40 hours	17.00 (0–51)	20.15 ± 15.07		2.00 (0–30)	4.97 ± 6.85	
Night shift			<b>0.044</b>			<b>0.013</b>
no	12.00 (0–50)	15.52 ± 12.71		2.00 (0–25)	3.29 ± 4.34	
yes	15.00 (1–51)	21.00 ± 16.04		3.00 (0–30)	6.42 ± 8.45	
Working period at Puskesmas			<b>0.024</b>			0.379
6 months – 5 years	15.50 (0–51)	18.84 ± 14.33		2.00 (0–30)	4.54 ± 6.24	
> 5 years	10.50 (0–50)	14.31 ± 12.24		2.00 (0–25)	3.16 ± 4.30	

Variable	Emotional exhaustion score			Depersonalisation score		
	median (min–max)	mean ± SD	<i>p</i>	median (min–max)	mean ± SD	<i>p</i>
Managerial duties			0.728			0.651
no	12.00 (0–51)	16.27 ± 14.40		2.00 (0–29)	4.51 ± 6.37	
yes	13.00 (0–51)	16.43 ± 13.16		2.00 (0–30)	3.59 ± 4.98	
Type of Puskesmas service			<b>0.049</b>			0.094
outpatient	14.00 (0–50)	17.27 ± 12.42		2.00 (0–25)	3.94 ± 4.70	
inpatient	10.00 (0–51)	15.31 ± 14.52		2.00 (0–30)	3.60 ± 6.00	
Characteristics of Puskesmas working area			<b>0.034</b>			<b>0.007</b>
urban	15.00 (0–51)	17.82 ± 12.97		3.00 (0–30)	4.41 ± 5.38	
rural/remote/very remote	9.50 (0–51)	15.22 ± 13.70		2.00 (0–29)	3.28 ± 5.23	
Employment status			0.461			0.786
non-civil servant	13.00 (0–51)	18.00 ± 15.08		2.00 (0–30)	4.63 ± 6.79	
civil servant	12.00 (0–50)	15.63 ± 12.51		2.00 (0–25)	3.39 ± 4.41	
Geographical location of Puskesmas			0.184			0.199
Java	14.00 (0–51)	17.01 ± 13.25		2.00 (0–30)	4.03 ± 5.44	
outside Java	10.00 (0–51)	15.38 ± 13.68		2.00 (0–29)	3.40 ± 5.11	
Average number of patients (per day)			0.338			0.349
≤ 25 patients	11.00 (0–51)	15.41 ± 13.55		2.00 (0–29)	3.37 ± 5.14	
> 25 patients	13.00 (0–51)	16.85 ± 13.36		2.00 (0–30)	3.99 ± 5.40	

Min – minimum, max – maximum, SD – standard deviation, *p* – level of significance, IDR – Indonesian Rupiah.

Variable	Emotional exhaustion score			Depersonalisation score		
	<i>B</i>	<i>β</i>	<i>p</i>	<i>B</i>	<i>b</i>	<i>p</i>
(Constant)	-19.379		< 0.001	-2.738		0.142
ER ratio	<b>13.470</b>	<b>0.426</b>	<b>&lt; 0.001</b>	<b>3.223</b>	<b>0.257</b>	<b>0.001</b>
Overcommitment	<b>1.576</b>	<b>0.393</b>	<b>&lt; 0.001</b>	<b>0.271</b>	<b>0.170</b>	<b>0.024</b>
Age (≥ 35 vs < 35)	-0.152	-0.006	0.924			
Marital status (married vs single/widower/widow)	-0.569	-0.016	0.739	-1.481	-0.106	0.086
Income per month (> IDR 10 million vs ≤ IDR 10 million)				0.693	0.044	0.489
Working hours per week (> 40 hours vs ≤ 40 hours)	0.117	0.004	0.929	0.426	0.040	0.536
Night shift (yes vs no)	0.306	0.008	0.865	<b>1.948</b>	<b>0.134</b>	<b>0.042</b>
Working period at Puskesmas (> 5 years vs 6 months – 5 years)	<b>-3.271</b>	<b>-0.122</b>	<b>0.038</b>			
Managerial duties (yes vs no)						
Type of Puskesmas service (inpatient vs outpatient)	0.433	0.016	0.747	-0.200	-0.019	0.779
Characteristics of Puskesmas working area (rural/remote/very remote vs urban)	-0.951	-0.035	0.456	-0.490	-0.046	0.473
Employment status (civil servant vs non-civil servant)						
Geographical location of Puskesmas (outside Java vs Java)	-1.907	-0.069	0.138	-0.443	-0.040	0.514
Average number of patients (> 25 patients vs ≤ 25 patients)						

Multiple linear regression with the enter method. ER ratio and overcommitment were analysed as numerical data. Socio-demographic variables and job characteristics were analysed as dummy variables. The category in brackets “( )” mentioned earlier is coded in the regression analysis as “1”, while the one written later is coded as “0”.

*B* – unstandardised coefficients; *β* – standardised coefficients; *p* – level of significance; IDR – Indonesian Rupiah

Emotional exhaustion. *R* = 0.755, *R* Square = 0.570, Adjusted *R* Square = 0.550, *F* = 28.468; Sig. = 0.000

Depersonalisation. *R* = 0.479, *R* Square = 0.229, Adjusted *R* Square = 0.197, *F* = 7.128, Sig. = 0.000

## Discussion

Our study shows a variety of burnout experiences among Puskesmas physicians. Some physicians report high emotional exhaustion, as seen from the maximum score of 51. For comparison, in MBI HSS, the highest score on the emotional exhaustion dimension was 54 [4]. Otherwise, some physicians reported never experiencing emotional exhaustion, as indicated by a score of 0. The same also happened to the dimensions of depersonalisation.

This study also found that Puskesmas physicians' perceptions of effort and reward varied widely. The lowest score of ER ratio was 0.28. This indicates that there are physicians who consider the reward obtained has exceeded the effort expended. However, some physicians report too high effort compared with too low a reward, as evidenced by the ER ratio of 3.00. A wide variation also occurs in overcommitment. The Employment Research in the Health Sector (Risnakes) [36] report also stated that there is a wide disparity in the suitability of personnel and

incentives – both income and non-income health workers – at Puskesmas between provinces. Overall, with the subjects of this study, the proportion of Puskesmas physicians who thought that their rewards were less than their efforts, as seen from the ER ratio, was more than 1, amounting to 45.6%. This proportion is greater than that reported by Wang et al. [27] concerning physicians in China. In addition, referring to the study of Hasselhorn et al. [54], this proportion is also higher than among nurses in several European countries (Italy, Germany, Poland, Slovakia, Belgium, France, and the Netherlands).

Three population characteristics are closely related to a higher effort-reward imbalance. First, the population of Puskesmas physicians who work more than 40 hours per week. Second, the group of Puskesmas physicians who have night shift duty. Third, the Puskesmas physicians who work in urban areas. It seems that within these three job characteristics, due to the higher effort that needs to be expended, physicians feel the need for additional rewards. A study in Germany also stated that effort-reward imbalance was positively correlated with the number of hours worked per week and negatively correlated with free weekends and private partnerships [55].

In this study, the results of the Mann–Whitney test prove the relationship between several socio-demographic and job characteristic variables with burnout dimensions. Physicians with less than 5 years of service at the Puskesmas tend to experience higher emotional exhaustion. This is in accordance with the results of the study of Wang et al. [27]. However, there is another study that found that more experienced health workers tend to feel higher emotional exhaustion [56]. According to several other studies, practical experience (time of service) is not related to burnout [17, 57, 58].

Puskesmas physicians who worked more than 40 hours a week experienced higher emotional exhaustion than their colleagues who worked less than 40 hours per week. This result is similar to a study in China [58] and Germany [55], as well as other studies [40, 59, 60]. Longer working hours lead to less time to rest, increasing the risk of exhaustion [61]. In addition, Puskesmas physicians who work on shifts at night tend to be more prone to emotional exhaustion and depersonalisation. This result is in line with other previous studies [27, 59]. Working at night causes disruption of one's sleep rhythm, which increases the risk of burnout [61]. However, there are also studies that prove that night shifts are not associated with burnout [57].

Our study also shows that physicians working in outpatient Puskesmas tend to feel higher emotional exhaustion than physicians working in inpatient Puskesmas. This may be because, in line with the continued increase in the number of inpatient Puskesmas in Indonesia [62], the suitability of health workers and supporting resources in outpatient Puskesmas is better than in outpatient Puskesmas [36]. A study also showed that there is a contribution by general health care system problems and limited support resources to occupational stressors in community-based physicians [63]. Another study also showed that the greater the ratio of physicians in a team, the lower the level of emotional exhaustion [64]. Meanwhile, Puskesmas physicians who work in urban areas tend to experience higher levels of emotional exhaustion and depersonalisation. This may be due to higher urban environmental psychosocial pressures [65].

The correlation test results show that there is a correlation between effort-reward imbalance and burnout dimensions. The higher the perception of effort and overcommitment, the higher the emotional exhaustion and depersonalisation experienced by Puskesmas physicians. On the other hand, the higher the rewards obtained by Puskesmas physicians, the lower the level of emotional exhaustion and depersonalisation. The study by Yuan et al. [41] in China also showed a correlation between the ER ratio with emotional exhaustion and cynicism.

The main finding of our study was that effort-reward imbalance was a significant positive predictor of emotional exhaustion and depersonalisation among Puskesmas physicians. The study by Wu et al. [40] among physicians in Liaoning and the study by Wang et al. [27] among physicians in Shanghai, both in China, also reported that both high effort and low reward were significant predictors of emotional exhaustion and depersonalisation. In addition, this study also found that overcommitment is also a significant positive predictor of emotional exhaustion and depersonalisation, but this was not as strong as the effort-reward imbalance. Studies in China also proved that overcommitment is a predictor of emotional exhaustion and cynicism [40, 41]. While the study by Wang et al. [27] showed that with multivariate tests, overcommitment proved to be a predictor of emotional exhaustion but not depersonalisation. In general, the results of this study also confirm Siegrist's [42–44] theory that the effort-reward imbalance has an impact on health problems.

The study also found that night shifts were a significant positive predictor of depersonalisation. Meanwhile, a working period of more than 5 years is a significant negative predictor of emotional exhaustion. However, these two variables are weaker predictors than the effort-reward imbalance and overcommitment. A study by Baptista et al. [45] among primary health care physicians in Portugal also found that during the pandemic, physicians with 6–15 years of service were more at risk of patient-related burnout than doctors with 5 years of service or less.

### Limitations of the study

We acknowledge that this study has some limitations. Online surveys, although technically more practical and which can reach many areas in a short time, are difficult to access by physicians in areas that have difficulty with Internet access. A sampling procedure with online surveys may also be under-represented by all Puskesmas physicians. Consecutive sampling techniques, rather than probability sampling, also allow for selection bias [45]. Thus, the sample in this study may not be generalisable to the entire population of Puskesmas physicians in Indonesia. It should be noted that the data collection for this study was carried out during the COVID-19 pandemic. However, because we did not measure the variables associated with handling the pandemic, we cannot confirm the extent of the association of the pandemic with this outcome.

### Conclusions

There is a large proportion of Puskesmas physicians who perceive a high effort condition with low reward. In addition, it is proven that the effort-reward imbalance has a significant relationship with emotional exhaustion and depersonalisation. Taking into account other factors related to the effort-reward imbalance and burnout dimensions in the findings of this study, we recommend the following: First, further studies are needed by enlarging the sample, if possible with probability sampling, and broadening the scope of participants so that they are more representative of Puskesmas physicians from all provinces in Indonesia. Second, it is important to supervise the implementation of working hours so that they do not exceed the maximum number of working hours and the balance of working the night shift. This can be done by regulating the work system and improving the distribution of physicians to match the standards and needs of the Puskesmas. Third, setting standards and forms of balanced rewards for Puskesmas physicians is needed. This can be done through special studies involving experts.

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